



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

SUBJECT: Evaluation of Walter Cokes' status under the RCRAInfo Corrective
Action Environmental Indicator Event Code (CA 725)
EPA I.D. Number ALD 000 828 848

FROM: James H. Smith
Corrective Action Specialist
Corrective Action Section

THRU: Karen Knight, CHMM, Chief
Corrective Action Section

TO: Jeffrey T. Pallas, Chief
Restoration and Underground Storage Tank Branch

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Walter Cokes' status in relation to the following corrective action event code defined in the Resource Conservation and Recovery Information System (RCRAInfo):

1) Current Human Exposures under Control (CA 725)

Concurrence by the Restoration and Underground Storage Tank Branch Chief is required prior to entering these event codes into RCRAInfo. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by signing and dating this memorandum.

QUICK REFERENCE FOR STATUS OF ENVIRONMENTAL INDICATORS					
Name and EPA I.D. Number	Location (City or Town)	Current CA725 Decision	Current CA750 Decision	If Current Decision is Negative, Projected Date for Positive EI	
				CA725	CA750
Walter Coke, Inc. ALD 000 828 848	Birmingham	NO	NO	TBD	TBD

II. HISTORY OF ENVIRONMENTAL INDICATOR EVALUATIONS AT THE FACILITY AND REFERENCE DOCUMENTS

This Environmental Indicator (EI) evaluation is the third evaluation of environmental indicators for Sloss Industries/Walter Coke, Inc. The first EI evaluation was completed in September 30, 1998. The EI determination was a CA725IN and CA750NO. The second EI was completed in September 30, 2005. The EI determination was CA725YE and CA750 NO. The discussions, interpretations, and conclusions on contamination and exposures at the facility are based on the following reference documents:

- U.S. Environmental Protection Agency. August 1989. *RCRA Facility Assessment Report*.
- Arcadis G&M, Inc. November 1991. *Draft Final RFI Work Plan, Sloss Industries: Volumes I through III*.
- Arcadis G&M, Inc. February 1996. *RCRA Facility Wide Investigation, Sloss Industries: Volumes I through IV*.
- Arcadis G&M, Inc. November 1996. *RCRA Facility Investigation, Coke Manufacturing Plant, Sloss Industries: Volumes I through III*.
- Arcadis G&M, Inc. January 1998. *RCRA Facility Investigation, Land Disposal Areas, Sloss Industries: Volumes I through III*.
- Arcadis G&M, Inc. February 1999. *RCRA Facility Investigation, BTF and Sewers, Sloss Industries: Volumes I through III*.
- Arcadis G&M, Inc. December 1999. *RCRA Facility Investigation, Chemical Manufacturing Plant, Sloss Industries: Volumes I through II*.
- Arcadis G&M, Inc. February 2001. *Phase II RCRA Facility Investigation, Coke and Chemical Manufacturing Plants, Sloss Industries: Volumes I through II*.
- Arcadis G&M, Inc. January 2003. *Phase II RCRA Facility Investigation, Land Disposal Areas and BTF and Sewers, Sloss Industries: Volumes I through II*.
- Arcadis G&M, Inc. February 2002. *RCRA Facility Investigation Interim Remedial Measures Work Plan*.
- Arcadis G&M, Inc. August 2004. *Draft Data Gap Analysis and Proposed Environmental Indicators Sampling Plan*.
- U.S. Environmental Protection Agency. September 2004. *Response to Comments for Draft Data Gap Analysis and Proposed Environmental Indicators Sampling Plan*.
- Arcadis G&M, Inc. February 2005. *Final Data Gap Analysis and Proposed Environmental Indicators Sampling Plan*.
- CH2M HILL. 2005. *Consolidated Overview of Environmental Data in Support of the Environmental Indicators Determination: Sloss Industries, Birmingham, Alabama*.
- U.S. Environmental Protection Agency. 2007 Evaluation of offsite analytical data to Region 4 Health Based Risk Cleanup Levels.
- Air Monitoring Data Shuttlesworth Drive Air Monitoring Station, Jefferson County Department of Health , Birmingham, Alabama, January 2008.
- Phase 3 RFI Report dated March 27, 2009.

Draft Residential Sampling Report dated December 2009.

EPA SEDS, Sampling Investigation Report, Walter Energy, Inc., Birmingham, Alabama, Conducted September 22-24, 2010 dated February 10, 2011.

Groundwater Interim Measures Work Plan Addendum for Former Chemical Plant dated February 11, 2011.

EPA Letter Establishing Cleanup Levels dated April 13, 2011.

EPA conditional approval letter of the Residential Cleanup Work Plan dated June 10, 2011.

Revised Residential Sampling Report dated May 13, 2011.

III. FACILITY SUMMARY

General. Walter Coke, Inc., formerly Sloss Industries Corporation (Sloss), is located in Birmingham, Jefferson County, Alabama. Walter Coke manufactures coke at their Birmingham facility. The original coke manufacturing facility began operation in 1919 as Sloss Sheffield Steel and Iron Company producing foundry and furnace coke and coke by-products. Chemical manufacturing of Toluene Sulfonyl Acid (TSA) 94 began at the site in 1948; operations expanded with the production of sulfones through a sulfonation process of sulfuric acid and benzenesulfonyl chloride (BSC), until all chemical manufacturing operations ceased in 2002. An iron blast furnace which produced pig iron from iron ore began operation in 1958; blast furnace operations ceased in 1979 and the furnace was decommissioned in 1984. The mineral wool plant, which manufactured mineral fibers used for ceiling tiles and insulating products, was built in the late 1947 and ceased operations in 2010. The biological treatment facility (BTF) and sewers, designed to treat wastewater generated at the facility, was constructed in 1973 and is still in operation.

Land Use. Land use in the surrounding areas is a mixture of industrial, open pit mining, natural wooded uplands, and residential. Additional coke and iron manufacturing facilities currently operate or have historically operated in the local vicinity.

Wastes Generated. Typical wastes historically generated and managed at the facility included the following:

- Coking processes generate a listed hazardous waste, K087, which can be considered exempt from RCRA Subtitle C requirements if recycled back into the coke oven. Contact and non-contact cooling water is used in the coke plant. Sludge is generated in the coke quenching process. Fugitive dust emissions deposit coal dust containing arsenic and polycyclic aromatic hydrocarbons (PAHs) and coke breeze throughout the process area and offsite. Runoff from the coal storage area enters the storm sewer while runoff from the process area enters the BTF sewer system. Leakage of coal tar from pumps, valves, and piping has occurred. Prior to construction of the BTF in 1973, coal tar in waste water was conveyed through the historic waste water ditch to the Polishing Pond. Solidified coal tar, PAHs and metals are also present in the storm water ditch that discharges into Five Mile Creek.
- The mineral fiber process produced two waste streams—(1) a flue dust from the 5 cupolas used for melting the raw materials, and (2) a process waste stream, similar in composition to the product was generated at several points in the plant and stored in a waste pile.
- Prior to September 1987, the (now decommissioned) chemical plant generated a wastewater that was characteristically hazardous (for corrosivity) in the Benzene Sulfonyl Chloride (BSC) process; a

neutralization system was later added to render this waste stream nonhazardous. Contact and non-contact cooling water was collected and discharged to the BTF for treatment. A centrifuge wastewater was generated in the sulfone production process, stored in a tank, and gradually released to the BTF sewer for treatment.

- Waste streams generated at the BTF include a biological sludge, which was previously landfilled onsite but is currently disposed offsite, and treated water, which discharges to Five Mile Creek under an NPDES permit.
- The blast furnace operation generated only one waste stream from 1958 to 1983—blast furnace emission control sludge. The sludge was formerly a listed hazardous waste (F016) and was stored in two onsite waste piles. This material is no longer a listed hazardous waste.
- The facility produces electrical power onsite. Coke oven gas is used as a fuel for the power plant. Only a small amount of waste oil, which is recycled, has historically been generated at the power plant.
- Fine coal dust is generated during storage and facility operations and has the potential to migrate offsite.

Regulatory History. The following provides a brief chronological overview of the RCRA regulatory history for the Walter Coke, Birmingham facility. The information is not intended to be comprehensive, but rather highlights the primary regulatory drivers at the facility:

- November 19, 1980, original Part A application submitted to EPA by Jim Walter Resources; final Part A application identified only the equalization basin as a regulated unit (surface impoundment); EPA I.D. No. ALD 000 828 848 was assigned to the facility.
- November 12, 1985: Part B permit application was submitted to EPA.
- In lieu of the facility's original request for a variance from the surface impoundment retrofitting requirements, the facility submitted a closure plan to clean close the equalization basin. The closure plan was conditionally approved on September 15, 1987; closure of the unit was certified by ADEM on March 30, 1988.
- May 9-10, 1989: EPA conducted a Visual Site Inspection (VSI) of the facility; a RCRA Facility Assessment (RFA) was completed in August 1989. The RFA identified 39 SWMUs, including the closed equalization basin (SWMU 13). Of the 39 SWMUs, 15 were noted by EPA to exhibit low or no potential for release; the remaining 24 were noted as having a potential to release to one or more environmental media.
- September 29, 1989: Section 3008(h) Administrative Order 89-39-R issued to Sloss Industries to perform a RCRA Facility Investigation (RFI) to assess releases of hazardous wastes or hazardous constituents at or from the facility and select remedies to protect human health and the environment in a Corrective Measures Study (CMS).
- 1990-1994: Sloss initiated planning for the RFI to characterize the nature, extent, and rate of contaminant migration from the identified SWMUs. The RFI Work Plan to investigate the 39 SWMUs (as four areas based on similar industrial activities) was approved by EPA in 1994.
- 1995-2003: Sloss completed Phase I and Phase II RFI investigations during this time span, and submitted reports (as completed) for the four areas under investigations (Coke Manufacturing Plant,

Land Disposal Areas, BTF and Sewers, and Chemical Manufacturing Plant), as well as a Facility-wide Investigation (FWI) .

- September 1998: Environmental Indicator Determination, CA725IN CA750NO
- March 1, 2005: EPA approved the *Final Data Gap Analysis and Proposed Environmental Indicators (EI) Sampling Plan*; Sloss implemented the sampling plan in April 2005.
- July 2005: Draft EI Memo (RCRAInfo CA 725 and 750) submitted to EPA; a Consolidated Overview of Environmental Data (COEID) report, prepared to support the EI determinations, submitted concurrently with EI.
- September, 2005: Environmental Indicator Determination.
- June 2007: Interim Measures Work Plan Storm Water Ditch and SWMU 39.
- June 2007: Interim Measures Work Plan Storm Water Ditch Approved.
- February 2007: Draft Phase III RCRA Facility Investigation Work Plan.
- January 2008: Phase III RCRA Facility Investigation Work Plan approved.
- February 2008: Off-site Residential Soil Sampling Investigation Required.
- Phase 3 RFI Report dated March 27, 2009.
- February 2011: Revised IM Work Plan for Chemical Plant.
- May 2011: Residential Sampling Report.

IV. CONCLUSION FOR CA 725

The facility is located adjacent to residential areas, but has maintained perimeter fencing and has had only one incident that we are aware of unauthorized human access in the past 10 years. Hazardous constituents at the site are present in the shallow aquifer, soil, surface water, and sediment. Surficial soils are contaminated above 10^{-4} risk for metals, VOCs, and PAHs

Particulates containing arsenic and PAHs and benzene released to the air from Walter Coke have been identified during ambient air monitoring performed by Jefferson County Department of Health, Alabama. Offsite soil sampling in the residential areas adjacent to Walter Coke in Collegeville, Harriman Park, and Fairmont communities detected PAHs expressed as benzo(a)pyrene toxicity equivalent (TEQ) above 10^{-4} cleanup level at 1.5 mg/kg, indicating a plausible exposure to human health at 23 properties. In addition, off site sampling data taken at schools and residences indicates that inorganic arsenic exceeds a hazard index (HI) of 1 at 37 mg/kg at 3 residential properties and one school. In addition, there are plausible human exposures to residents in ditches outside the fence line of the main plant and BTF Area containing PAHs. PAHs above acceptable levels have also been identified in the sediments of Five Mile Creek. At this time, the current human exposures associated with the site are not under control. Therefore, a "NO" designation is recommended for CA 725 (*Current Human Exposures Under Control*). The following explanation: "Documentation of Environmental Indicator Determination" provides a detailed discussion for the rationale of why human exposures are not controlled.

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR
DETERMINATION**

Interim Final 2/5/99

**RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA 725)**

Current Human Exposures Under Control

Facility Name: Walter Coke, Inc.
Facility Address: 3500 35th Avenue North, Birmingham, Alabama
Facility EPA ID #: ALD 000 828 848

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?
- ☒ X If yes - check here and continue with #2 below.
 _____ If no -re-evaluate existing data, or
 _____ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are

for reasonably expected human exposures under current land-use and groundwater-use conditions ONLY, and do not consider potential future land or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

Current Human Exposures Under Control Environmental Indicator (EI) RCRAInfo code (CA725)

2.	Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated" above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?			
	<u>Yes</u>	No	IN	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	—	—	Metals, VOCs, and SVOCs detected above tap water screening levels and MCLs across the site.
Air (indoors)	—	—	<u>X</u>	Off-site VOC plume in groundwater.
Surface Soil) (e.g., <2 ft)	<u>X</u>	—	—	Metals, VOCs, and SVOCs detected above screening levels Coke Manufacturing Plant, former Chemical Plant, drainage ditch next BTF Area, Metals and PAHs in Land Disposal Area. Residential soils contaminated with PAHs and arsenic.
Surface Water	<u>X</u>	—	—	Metals, VOCs, SVOCs and PAHs in Five Mile Creek and metals in Harriman Park Ditch. Metals in Lafarge Quarry. VOCs, PAHs, and metals SWMU #13, SWMU #22, and SWMU #25.
Sediment	<u>X</u>	—	—	Metals, VOCs, PAHs and SVOCs detected above screening levels in onsite ditch sediments, PAHs in Five Mile Creek, and metals Harriman Park Ditch (or tributary), PAHs ditch along 35 th Avenue and Shuttlesworth Drive.
Subsurface Soil	<u>X</u>	—	—	Metals, VOCs, SVOCs, and PAHs detected above (e.g., >2 ft) screening levels onsite.

Air (outdoors)

X

JCDH detected PAHs, arsenic and benzene in the air at air monitoring station next to Walter Coke.

If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Table 1 lists potentially complete exposure pathways onsite to site workers and trespassers and offsite to residents in the residential neighborhoods surrounding the facility to chemicals exceeding screening levels.

Table 1

Exposure media exceeding screening levels for industrial (onsite)/residential(offsite) soil and tap water

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Chemicals exceeding screening levels
Current and Future	Soil	Surface Soil (0-1 Foot)	Onsite surface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Industrial Worker	Adult	Dermal, Ingestion, Inhalation	BaP BbF BkF DahA Naphthalene carbazole Benzene Arsenic Antimony Selenium Thallium
				Trespasser	Adolescent	Dermal, Ingestion, Inhalation	Same as above
Current and Future	Bank soil	Bank soil	Bank soil along Five Mile Creek	Recreator	Adult/ Adolescent/ Child	Dermal, Ingestion	BaP TEQ
Current and Future	Sediment	Sediment	Drainage Ditch onsite (next to BTF Area)	Trespasser/ residential	Adolescent/ child	Dermal, Ingestion, Inhalation	Area outside fence BaP BbF BkF DahA Chrysene Inside fence Same as above and

							IDP Coal Tar
Current and Future	Sediment	Sediment	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion,	Mercury Manganese Cobalt
Current and Future	Surface water	Surface water	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Cyanide
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22, SWMU 25	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	SWMU 13 and SWMU 25- Benzene Cholorobenzene Carbazole SWMU 13- BaP Dibenzofuran Naphthalene Manganese in all three SWMU water
Current and Future	Surface water	Surface water	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion, Inhalation	Recreators may contact COPCs with surface water.
Current and Future	Surface water	Surface water	Five Mile Creek	Recreator	Adult/Adolescent/Child	Dermal, Ingestion,	Arsenic
Current and Future	Surface water	Surface water	LaFarge Quarry Lake	Mining Worker/ Trespasser	Adult/Adolescent/Child	Dermal, Ingestion,	Selenium
Current and Future	Food	Fish	LaFarge Quarry	Recreator	Adult/Adolescent/	Ingestion	Unknown
Current and Future	Food	Fish	Five Mile Creek	Recreator	Adult/Adolescent/	Ingestion	Unknown
Current and Future	Groundwater	seeps	LaFarge quarry walls	Mining worker	Adult	Ingestion	Manganese Iron
Current and Future	Indoor air	Indoor air (onsite)	Indoor air (onsite)	Industrial worker/office worker	Adult	Inhalation	Potential for benzene from groundwater
Current and Future	Ambient air	Ambient air (onsite)	Ambient air across the site where there are impacted soils.	Workers	Adult	Inhalation	Benzene
				Trespassers	Adult/Adolescent/Child	Inhalation	
Current and Future	Soil	Subsurface soil (1-10 Feet)	Onsite subsurface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Construction Workers	Adult	Dermal, Ingestion and Inhalation	I123CDP BbF Dibenzofuran Coal Tar- DNAPL BaP Dibenzofuran Fluoranthene Pyrene
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25	Construction Workers	Adult	Dermal/ Ingestion/ Inhalation	BaP BaA BbF BkF

Current and Future	Sediment	Sediment	SWMU 13 SWMU 22	Construction Workers	Adult	Dermal/ Ingestion/ Inhalation	SWMU-13- BaP BaA BbF BkF BbF Chrysene Naphthalene DahA I123cdP SWMU-22- BaA BaP BbF BkF DbA IDP benzene
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22, SWMU 25 and drainage ditch next to BTF Area	Construction Workers	Adult	Dermal	SWMU 13 and SWMU 25- Benzene Cholorobenzene Carbazole BaP Dibenzofuran Naphthalene Drainage Ditch- cyanide
Current and Future	Groundwater	Ambient Air (onsite)	Ambient air at Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Inhalation	Benzene Chlorobenzene Toluene Vinyl Chloride TCE Cis-1,2-DCE PCE Naphthalene
Current and Future	Groundwater	Shallow groundwater (onsite)	Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Dermal	Benzene Chlorobenzene 1,2,4-TCB Toluene Vinyl Chloride TCE Cis-1,2-DCE PCE Carbazole BaP 2,4-DMP Dibenzofuran Naphthalene Phenol Arsenic Manganese Thallium Coal tar
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Dermal, Ingestion	Benzene Chlorobenzene 1,2,4-TCB Toluene Vinyl Chloride TCE Cis-1,2-DCE PCE Carbazole

							BaP 2,4-DMP Dibenzofuran Naphthalene Phenol Arsenic Manganese Thallium
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Inhalation	Benzene Chlorobenzene Toluene Vinyl Chloride TCE Cis-1,2-DCE PCE Naphthalene
Current and Future	Soil	Soil	Residential properties and schools (offsite)	Residents, students, teachers	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	BaP TEQ Arsenic
Current and Future	Food	Food	Residents (offsite)	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/	BaP TEQ
Current and Future	Ambient air	Air	Residents	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Benzene Arsenic BaP
Current and Future	Ambient Air	Groundwater to Vapor Intrusion to Indoor Air	Residents	Residents	Children/ Adolescent/ Adults	Inhalation	Benzene Vinyl Chloride Naphthalene
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Ingestion	Benzene Vinyl Chloride Naphthalene
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Inhalation/ Ingestion/ Dermal	Benzene Vinyl Chloride Naphthalene
Current and Future	Sediment	Sediment	Sediments Ditch outside fence along 35 th Avenue and Shuttlesworth	Residents	Children/ Adolescent/ Adults	Inhalation/ Ingestion/ Dermal	BaP TEQ

See Number 3 “complete pathways” for the contaminants and their respective concentrations for each media.

References:

See complete reference list of documents on Page 2.

Soil Risk-Based Levels: EPA Region 9 Preliminary Remediation Goals:

<http://www.epa.gov/region09/waste/sfund/org/index.html>; industrial soil, residential soil, soil inhalation. U.S. Environmental Protection Agency (EPA).

Regional Screening Levels (RSLs) 2011.

EPA Letter Establishing Cleanup Levels dated April 13, 2011.

Memorandum: Assessing the Risk of arsenic in Soil: Considering Bioavailability

and Subchronic Toxicity and the Protective Risk Range, Dated February 5, 2004.

Surface Water Risk-Based Levels: EPA National Recommended Water Quality Criteria for the Protection of Human Health for Consumption of Organisms.

Groundwater Risk-Based Levels: If a Maximum Contaminant Level is available, lower of MCL or EPA Indoor Air Vapor Intrusion Value for target ELCR = 1×10^{-6} . If a MCL is not available, lower of the EPA Region 9 PRG (HI = 0.1) for tap water or EPA Indoor Air Vapor Intrusion Value: <http://www.epa.gov/safewater/mcl.htm#mcls>

USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) Federal Register, November 29, 2002 (Volume 67, Number 230).

Birmingham Air Toxic Report (2009).

Phase III RFI Report (2009).

Residential Sampling Report (May, 2011).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRAInfo code
(CA725)

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table
Potential Human Receptors (Under Current Conditions)

Contaminated Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food¹
Groundwater	No	No	No	No	No	No	No
Air (indoors)	IN	YE	--	--	--	--	--
Soil (surface, e.g., <2 ft)	YE	YE	No	No	YE	YE	YE
Surface Water	YE	No	No	No	YE	YE	No
Sediment	YE	No	No	No	YE	YE	No
Soil (subsurface e.g., >2 ft)	No	No	No	No	No	No	No
Air (outdoors)	YE	YE	IN	YE	No	YE	No

* - Indoor air exposure of workers is regulated by OSHA.

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).
3. enter “IN” for more information needed based on potential for exposure

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

 X If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

On-Site Exposure Points and Receptors

Soil.

Surface Soil

Surface soil (approximately 0-1 ft in depth) within, and at, areas potentially affected by SWMUs, is currently accessible to outdoor industrial workers and construction workers at the former Chemical Plant, Coke Manufacturing Plant, Land Disposal Areas and Biological Treatment Facility (BTF) Area. However, the activities performed by site workers in the areas of the SWMUs are very limited, and site workers are required to follow the Health and Safety Plan and to wear personal protective equipment (PPE) (including gloves) in accordance with the Walter Coke's PPE Policy.

There is not a complete pathway for direct contact with surface soil.

However, it has been observed that site workers do not wear dust masks and are not protected from hazardous constituents in particulates from loose soils. Dusty conditions persist due to truck traffic, loose unconsolidated soil, and raw material fines.

The potential exposure route is dermal, ingestion, and inhalation. There is a complete pathway for indirect contact with surface soil under this scenario.

Trespassers

The main portion of the facility, former Chemical Plant and Coke Manufacturing Plant is fenced with staffed security gates. The Land Disposal Areas and BTF Areas are more accessible. There are gaps in the fences and there are areas that trespassers could access the site. In the past 10 years, trespassers have been observed only once; three adolescents on bicycles were observed near the (now) inactive Chemical Manufacturing Plant. Since trespassing has occurred trespassers are identified as a receptor at the site. However, since security is present exposure to soil is not considered a complete pathway.

On January 2, 2008, EPA observed a bicycle near SWMU 22-Polishing Pond outfall at the location of the storm water ditch. There were no fences to prevent trespassers from accessing the BTF Area of the site or the storm water ditch. Since 2008, Walter Coke has installed a fence in the BTF Area and there is no potential for direct contact to surface soil and sediment to trespassers.

Analysis of Coke Plant, Chemical Plant, and BTF Area soils detected the following contaminant maxima: Arsenic (220 mg/kg), Benzene (59 mg/kg), benzo(a)anthracene (170 mg/kg), benzo(a)pyrene (BaP) (130 mg/kg), benzo(b)fluoranthene (140 mg/kg), benzo(k)fluoranthene (110 mg/kg), etc. Concentrations of chemicals in the surface soil exceed industrial screening levels for human health.

The potential route of exposure is dermal, ingestion and inhalation. Walter Coke has a fence and security and the pathway of exposure to surface soil to trespassers is incomplete.

In the Land Disposal Area surface soils are known to be contaminated with PAHs. Soil sample 24-SL029 BbF (30 mg/kg), I123CDP (14 mg/kg), BaP (20 mg/kg), BkF (12 mg/kg), BaA (18 mg/kg), DahA (2.2 mg/kg) (BaP TEQ 28.6 mg/kg). 38-SL001 BbF (88 mg/kg), I123CDP (26J mg/kg), BaA (93 mg/kg), BaP (49 mg/kg), BbK (34 mg/kg), Chrysene (84 mg/kg), DahA (13 mg/kg).

The Land Disposal Area is accessible through LaFarge Quarry entrance by trespassers on foot. There is no fence between the two properties. The exposure pathway for trespassers is complete.

Subsurface Soils

Subsurface soils (>2 feet in depth) are impacted with SVOCs and VOCs above industrial soil screening levels and construction workers may be exposed to contaminants. Walter Coke has a health and safety plan and workers are required to wear PPE.

There is no potential for trespassers to contact subsurface soils and therefore there is no complete pathway.

Groundwater. Groundwater is contaminated with VOCs and SVOCs and metals above their MCLs and Region PRGs for tap water. Benzene has present in the groundwater at former Chemical Plant, Coke Plant, Land Disposal Area, and BTF Area.

Currently, there is no potable use of groundwater onsite. In addition, there are currently no excavation activities to the groundwater table (ranging from 5 to 20 ft below ground surface, depending on the location onsite).

However, in the event of excavations below the water table there is a potential for human exposure to construction workers. Walter Coke has a Health and Safety Plan and workers are required to wear PPE to minimize and prevent exposure.

Currently there are no exposure point's onsite to groundwater and there is not a complete pathway. Indirect exposures to groundwater via indoor air vapor intrusion are addressed below.

Ambient Air. Exposure points were identified in ambient air for site industrial workers as a result of fugitive dust emissions and volatilization from surface soil at SWMUs, SWMU-impacted areas and product storage areas. Potential exposure from hazardous constituents in the ambient air exists from benzene, PAHs and arsenic. Jefferson County Department for Health collected air monitoring data from 2005 to 2006 at the Shuttlesworth Avenue air monitoring station. The air monitoring station is 20 meters from Walter Coke's truck entrance. The air quality at the monitoring station is indicative of ambient air conditions onsite and offsite. It is likely the ambient air concentrations are even higher at source areas. The data indicates that particulates contain arsenic, benzo(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene, and benzene from Walter Coke. EPA's Technical Services Section performed a preliminary risk assessment and determined that arsenic is in concentrations of 10^{-5} risk range. The PRG for arsenic is $4.5E-4$ ug/m³. Benzo(a)anthracene, benzo(a)pyrene (BaP), and dibenz(a,h)anthracene are present in the 10^{-6} risk. Benzo(a)pyrene exceed the 10^{-5} risk for cancer.

Also, benzene exceeds the 10^{-4} risk at the maximum concentrations detected and 10^{-5} for the mean concentrations.

Benzene Air Monitoring Data (Jefferson County Department for Health) for Walter Coke (SIAL) and other locations:

Table 2

Site	Analyte	UNITS	Max	Mean
ETAL	Benzene	ppbv	2.66	0.908
NBAL	Benzene	ppbv	4.02	0.993
PVAL	Benzene	ppbv	0.51	0.178
SIAL	Benzene	ppbv	9.87	1.936

Table 2 Cont.

PRG ug/m ³	MAX ug/m ³	Exceed 10^{-6}	Exceed 10^{-5}	Exceed 10^{-4}
2.5E-01	8.50	YES	YES	No
2.5E-01	12.84	YES	YES	No
2.5E-01	1.63	YES	No	No

2.5E-01	31.53	YES	YES	YES
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Table 2 Cont.

PRG ug/m3	MEAN ug/m3	Exceed 1>6	Exceed 1>5	Exceed 1>4
2.5E-01	2.90	YES	YES	no
2.5E-01	3.17	YES	YES	no
2.5E-01	0.57	YES	no	no
2.5E-01	6.19	YES	YES	no

These particulates and vapors are present in an air monitoring station 20 meters from Walter Coke and likely originate from facility.

There is a complete pathway to onsite workers from same constituents identified at the Shuttlesworth monitor.

Indoor Air. There is the potential for indoor air vapor intrusion (IAVI) into buildings at those locations onsite where VOCs are present in groundwater beneath occupied buildings (COEID, 2005). The buildings situated atop VOC plumes are located in the Coke Plant and Chemical Plant. The buildings in the Chemical Plant are not currently occupied since the Chemical Plant is not in operation. In the COED (2005) the IAVI was evaluated for the former Chemical Plant using the Johnson and Ettinger Model for groundwater to indoor air vapor intrusion.

Industrial worker-ELCR = 4×10^{-6} , HI = 2

Construction Worker-ELCR = 2×10^{-7} , HI = .07

Utility Worker-ELCR = 1×10^{-6} , HI = .1

Trespasser-ELCR = 8×10^{-7} , HI = .2

Shallow groundwater monitoring results for VOCs the Chemical Plant Wells (Draft Phase III RFI Report) are as follows:

Table 3

Analyte	MW-51	MW-53	MW-54	MW-55	MW-56	MW-81
Benzene	16 ug/L	250 ug/L		46,000 ug/L	38,000 ug/L	78,000 ug/L
Cis-12 DCE	280 ug/L					
Vinyl Chloride	410 ug/L	77 ug/L				
Chlorobenzene		53 ug/L	3,100 ug/L	250,000 ug/L	9,500 ug/L	590 ug/L
Toluene				74,000 ug/L		
Ethyl benzene				350 ug/L		
PCE			80 ug/L			

Walter Coke has covered the former Chemical Plant with 5 feet of mineral wool dirt to minimize VOC vapors from migrating from the soil to the ambient air and the JCDH air monitor across the street.

Coke Plant

Potential exposure points in indoor air were identified at buildings situated above VOC plumes in groundwater within the Coke Plant. It should be noted that, according to Walter Coke, no cracks have been observed in the foundations of the buildings in the Coke Plant. Walter Coke has not sampled indoor air for site specific constituents in control rooms or administrative offices in the plant. Air monitoring should be conducted to assess impact from IAVI.

Groundwater was evaluated for IVAI from ground water concentration in wells at the Coke Plant (COEID, 2005). Exceedances of Indoor Air Screening Levels occurred in MW-54-benzene was detected at 360 ug/L, chlorobenzene (73,000 ug/L), tetrachloroethene (2,100 ug/L), toluene (11,000 ug/L); MW-58-benzene (100 ug/L), naphthalene (19,000 ug/L); MW-59-benzene (1,700 ug/L), naphthalene (16,000 ug/L); and MW-60-benzene (8,600 ug/L).

Since 2005 COEID, a Phase III RFI Report (2009) has provided additional chemical data for all media throughout the site.

MW-82, naphthalene (1,800 ug/L), benzene (8.3 ug/L); MW-60 -naphthalene (5,200 ug/L), benzene (3,600 ug/L); MW-83-naphthalene (580 ug/L); chlorobenzene (300 ug/L); benzene (11 ug/L); MW-75 naphthalene (100 ug/L), benzene (44 ug/L); and MW-59-naphthalene (510 ug/L) and benzene (450 ug/L).

Excerpt from Table 2a

Constituent	Concentration in groundwater to indoor air from Table 2a Indoor Vapor Intrusion Guidance (2002) at attenuation factor of .001.
Trans 1,2 Dichloroethene	180 ug/L
Benzene	140 ug/L
Chlorobenzene	390 ug/L
Ethyl benzene	700 ug/L
Naphthalene	150 ug/L
Toluene	1,500 ug/L
Trichloroethene	5.3 ug/L
Vinyl Chloride	25 ug/L

As stated in EPA guidance entitled: *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (EPA, 2002), the Occupational Safety and Health Administration (OSHA) and EPA have agreed that OSHA generally will take the lead role in addressing occupational exposures. EPA expects that the vapor intrusion guidance document listed above to be used in EI determinations (CA 725) for administrative settings. EPA recommends that facilities be notified of the potential for the IAVI exposure pathway and that facilities consider potential exposures may result.

Therefore, the IAVI pathway needs to be further evaluated. However, based on the concentrations identified in the groundwater the exposure pathway is complete.

Surface Water.

Site Workers

SWMUs in the BTF (SWMU #13 Equalization Basin and SWMU #22 Polishing Pond) contain surface water and workers are present in these areas. Surface water is also present in the drainage ditch next to the BTF Area. Workers are required to wear gloves in accordance with the Walter Coke PPE Policy. In addition, there is no worker contact with surface water in the drainage ditch (SWMU #25 Storm Water Runoff Sewer) that traverses the site. However, there is a potential for construction workers and maintenance personnel to come into contact with water in the ditches. The BTF Area, SWMU #13, surface water contains metals (arsenic, mercury, etc.), VOCs (benzene, chlorobenzene, etc.), SVOCs (naphthalene, etc.) and PAHs (BaP equivalents) above tap water screening levels. SWMU #22 Polishing

Pond contains metals in the surface water above tap water screening levels. SWMU #25, Storm Water Runoff Sewer, contains VOCs, SVOCs, and metals above tap water screening levels.

At SWMU #25, Surface Water Runoff Sewer, surface water samples detected benzene, chlorobenzene at a maximum concentration of 1.40 ug/L and 7.5 ug/L. Benzene is above the tap water screening level and chlorobenzene is below screening levels for tap water. Carbazole (8.8 ug/L), manganese (150 ug/L), thallium (6.8J ug/L) are above tap water screening levels. Walter Coke has a Health and Safety Plan and PPE is required for any potential exposures. There is no significant exposure to site workers to surface water at SWMU #25.

While a risk assessment has not been performed for exposure to surface water to construction workers to (COPCs concentrations discussed under Trespassers) the exposure to construction workers is not expected to be significant if PPE is used. The pathway is incomplete.

Trespassers

There is a potential exposure to a trespasser to contaminated surface water in the plant's ditches.

At SWMU #25, Surface Water Runoff Sewer, surface water samples detected benzene, chlorobenzene at a maximum concentration of 1.40 ug/L and 7.5 ug/L. Benzene is above the tap water screening level and chlorobenzene is below screening levels for tap water. Carbazole (8.8 ug/L), manganese (150 ug/L), thallium (6.8J ug/L) are above tap water screening levels.

The SWMU 25 storm water ditch is accessible from the LaFarge Quarry entrance. There is a complete pathway to trespassers.

Storm Water Ditch next to BTF Area and SWMU #39, Blast Furnace Emission Control Sludge Landfill detected cyanide in 16 surface water samples during 1995 and 2001 sampling events. The highest concentration of cyanide was detected sample SW-18 at a concentration of 250 ug/L. The tap water screening level for cyanide is 730 ug/L.

There is a complete pathway to trespassers to contaminated surface water in the storm water ditch if accessed from LaFarge Quarry and that portion of the ditch outside the BTF fence.

There is a potential exposure to BTF Surface Water Impoundment at SWMU #13, Equalization Pond, to trespassers. Surface water contain metals (arsenic, mercury, etc.), VOCs (benzene, chlorobenzene, etc.), SVOCs (naphthalene, etc.) and PAHs (BaP equivalents) above tap water screening levels. The surface water sampling results at SWMU #13 exceeding screening levels for tap water are: 13-SW003 detected BaP TEQ (13.2 ug/L), dibenzo(a)furan (16 ug/L), naphthalene (5.4 ug/L), benzene (3.1 ug/L), chlorobenzene (16 ug/L), thallium (9.2J ug/L), cobalt (6.9J ug/L). 13-SW001 carbazole (100 ug/L), arsenic (9.9J ug/L), manganese (170 ug/L).

The BTF Area is enclosed by a fence. The exposure pathway to trespassers is not complete.

At SWMU #22, Polishing Pond, surface water impoundment, surface water samples reported in the Phase III RFI Report (2009) detected benzene, chlorobenzene at a maximum concentration of 0.41 ug/L and 2.9 ug/L below screening levels for tap water. Cobalt at 13 ug/L, manganese 180 ug/L, vanadium 12 ug/L exceeded screening levels. In 1998 surface water samples detected BaA (11 ug/L), chrysene (13 ug/L), exceed tap water screening levels (.029 ug/L) and 2.9 ug/L, and cyanide (150 ug/L) (COEID, 2005).

SWMU #22 is enclosed by a fence within the BTF Area. The exposure to surface water at SWMU #22 to trespassers is not complete.

Sediment.

Site Workers

SWMUs #13 and SWMU #22 in the BTF contain sediment impacted with PAHs above screening levels and workers are present in these areas.

SWMU #25 Storm Water Ditch contains PAHs, metals and SVOCs. Benzo(a)pyrene (BaP) Toxicity Equivalent Quotient (TEQ) compounds in sediment samples: 25-SD002 (8.5 mg/kg), 25-SD003 (2.3 mg/kg), 25-SD004 (17.2 mg/kg), 25-SD005 (2.3 mg/kg).

However, the sediments are covered with water year-round and are not contacted. Additionally, workers are required to wear gloves in accordance with the Walter Coke PPE Policy. There also is no worker contact with sediments in the drainage ditch SWMU# 25 that traverses the site. There is the potential exposure to sediment to construction workers if proper PPE is not maintained. If proper PPE is utilized there is no significant exposure to impacted sediments in ditches or impoundments onsite. The exposure pathway is incomplete.

Trespassers

However, there is a potential exposure pathway to sediment in ditches to trespassers. The storm water ditch that discharges into Five Mile Creek contains PAHs that exceed the 10^{-4} risk based cleanup standard for BaP. The maximum concentration detected for BaP, June of 1995, at SD-0002 is 82 mg/kg. The residential risk based cleanup at 10^{-4} for BaP is 1.5 mg/kg. Eight sediment samples taken in the storm water ditch exceed the 10^{-4} risk based cleanup levels for BaP.

Storm Water Ditch – Risk Results

- The storm water ditch contains cPAHs and metals at unacceptable risk levels to human health
- (15) – cPAHs, (15) - Arsenic = 19 locations exceed 10^{-6} risk;
- (15) - cPAHs, (15) - Arsenic = 17 locations exceed 10^{-5} risk;
- (8) – cPAHs locations exceed 10^{-4} risk;
- Total carcinogenic may exceed 10^{-4} risk (12 locations combined carcinogenic risk $> 10^{-5}$)
- 13 locations HQ >1.0 (antimony, barium, cadmium, copper, thallium, vanadium, zinc)

Table 4

FIELD SAMPLE ID	LOCATION ID	CHEMICAL	HAZARD INDEX	CARCINOGENIC RISK
			EXCEED HI > 3	EXCEED 10^{-4}
950608-FW-00-SD0002	SD-2	cPAHs	-	YES
950608-FW-00-SD0004	SD-4	cPAHs	-	YES
950609-FW-00-SD0005	SD-5	cPAHs	-	YES
010531-BT-00-SD0007	SD-7	cPAHs	-	YES

010531-BT-00-SD0008	SD-8	cPAHs	-	YES
010531-BT-00-SD0009	SD-9	cPAHs	-	YES
010531-BT-00-SD0010	SD-10	Antimony	YES	-
010601-BT-00-SD0011	SD-11	cPAHs	-	YES
010604-BT-00-SD0020	SD-20	cPAHs	-	YES

Coal tar was identified in Walter Coke's storm water ditch adjacent to the BTF Area. The presence of coal tar in the ditch that discharges into Five Mile Creek indicates that the facility is a likely source for coal tar identified in Five Mile Creek. The highest concentrations of PAHs in the ditch were detected during June 1995 sampling in the following samples: SD-2 BaA (74 mg/kg), BaP (82 mg/kg), BbF (100 mg/kg), BkF (130 mg/kg), chrysene (C) (69 mg/kg). SD-4 BaA (59 mg/kg), BaP (54 mg/kg), BbF (65 mg/kg), BkF (17 mg/kg), DbA (9.1 mg/kg), IdP (25 mg/kg), and Naphthalene (9.6 mg/kg). SD-5 BaA (9.6 mg/kg), BaP (9.6 mg/kg), BbF (12 mg/kg), IDP (7.9 mg/kg), and Naphthalene (30 mg/kg).

Currently, there is a fence around the drainage ditch further limiting potential for exposure.

In the portion of the ditch where a fence is not present at the confluence with Five Mile Creek there is a complete exposure pathway to trespassers at sediment sample SD-2. There is also a complete exposure pathway to the portion of the drainage ditch outside the BTF Area fence along Summit Drive near the BTF entrance at the location of SD-5.

There is a complete pathway for trespassers to ditch sediments.

SWMUs #13 and SWMU #22 in the BTF contain sediment impacted with PAHs and SVOCs above screening levels and workers are present in these areas. A fence prevents trespassers from contacting sediments in the impoundments. There is not a complete pathway for a trespasser.

SWMU #25, Storm Water Ditch, contains PAHs, metals and SVOCs. Benzo(a)pyrene (BaP) Toxicity Equivalent Quotient (TEQ) compounds in sediment samples: 25-SD002 (8.5 mg/kg), 25-SD003 (2.3 mg/kg), 25-SD004 (17.2 mg/kg), 25-SD005 (2.3 mg/kg). This area is accessible from the LaFarge property as there is no fence separating the properties. There is a complete pathway for a trespasser.

Off-Site Exposure Points and Receptors

Soil. Soil is accessible to residents at homes and schools situated in the vicinity of the site. Homes with children have been identified in the Harriman Park and Collegeville Communities. Surface soil is expected to be the most impacted media. Air deposition is the migration pathway from Walter Coke to off-site areas. Therefore, exposure points were identified in off-site surface soil. Arsenic and benzo(a)pyrene have been detected in the surficial soils in residential areas in the Harriman Park and Collegeville communities. Arsenic was detected in excess of the 10^{-4} cleanup level in three front yards at concentrations ranging from 39 to 49 mg/kg. Soil impacted with benzo(a)pyrene at a concentration of 6.2 mg/kg was detected at the Riggins School playground in the Fairmont Community in excess of 10^{-4} risk based level (COEID, 2005).

Off-Site Soil – Residential Soils exceeding 10^{-6} Risk

- (29) – cPAHs, (15) - Arsenic = locations exceed 10^{-6} risk;

- (6) – cPAHs, (15) - Arsenic = locations exceed 10^{-5} risk;
- (2) – cPAHs, (3) - Arsenic = locations exceed 10^{-4} risk;
- Total carcinogenic risk for off-site resident may exceed 10^{-4} risk (3 locations combined carcinogenic risk $>10^{-5}$)
- Characterization of the off-site soil in the residential yards incomplete
- Community may decide that 10^{-5} risk is acceptable

Table 5

LOCATION	Analyte	Result	Res Soil PRG	Cancer Risk Levels		
				Exceed 10^{-6}	Exceed 10^{-5}	Exceed 10^{-4}
OSE # 3	Arsenic	42	0.39	YES	YES	YES
OSS # 13	Arsenic	40	0.39	YES	YES	YES
OSS # 14	cPAHs	6.4	0.062	YES	YES	YES
OSS # 9	Arsenic	49	0.39	YES	YES	YES
OSW # 8	cPAHs	7.4	0.062	YES	YES	YES

Offsite Residential Investigations 2009

In 2009, Walter Coke implemented an approved work plan to sample 76 properties off site in Collegeville (across from the coal piles), Fairmont, and Harriman Park. In a revised Residential Sampling Report dated May 13, 2011, twenty-three residential properties were identified including a church, 3 schools (Riggins School, Hudson School and the former Carver High School) as having benzo(a)pyrene TEQ (BaP) and/or arsenic greater than EPA's cleanup levels established in a April 13, 2011 correspondence to Walter Coke, Inc. In addition, there is a right-of-way property between Walter Coke's coal piles and Collegeville community with BaP TEQ greater than the cleanup level for BaP TEQ. The cleanup level for BaP TEQ was set at a 10^{-4} concentration of 1.5 mg/kg and for sieved arsenic at a hazard index (HI) of 1 at 37 mg/kg based on 60% bioavailability. The carcinogenic concentration of sieved arsenic at 10^{-4} is 68 mg/kg.

Table 6

Collegeville: Benzo(a)pyrene (BaP) Toxicity Equivalent (TEQ) (1.5 mg/kg)

BaP TEQ	10^{-6} Cancer Risk	10^{-5} Cancer Risk	10^{-4} Cancer Risk
Total Properties Sampled-49	49	48	20
Total Residences-43	43	41	16
Total Right-of-ways-2	2	2	1
Total Schools-3	3	3	2
Churches-1	1	1	1

Table 7**Harriman Park: Benzo(a)pyrene (BaP) Toxicity Equivalent (TEQ) (1.5 mg/kg)**

BaP TEQ	10 ⁻⁶ Cancer Risk	10 ⁻⁵ Cancer Risk	10 ⁻⁴ Cancer Risk
Total Properties Sampled-21	21	21	4
Total Residences-18	18	18	4
Community Center-1	1	1	-
Walter Coke Offsite Property-2	2	2	-

Table 8**Fairmont: Benzo(a)pyrene (BaP) Toxicity Equivalent (TEQ)**

BaP TEQ	10 ⁻⁶ Cancer Risk	10 ⁻⁵ Cancer Risk	10 ⁻⁴ Cancer Risk
Total Properties Sampled-6	6	6	2
Total Residences-5	5	5	1
Total Schools	1	1	1

It should be noted that 8 of the residential properties have been cleaned up as of September 22, 2011.

TABLE 3-1**Summary of Properties Proposed for Remedial Action**

Residential Soil Remedial Action Work Plan, Walter Coke, Inc., Birmingham, Alabama

Property ID	Address	Sample Yard/Location	Exceedance Concentration Sieved Arsenic (37 ppm)	Exceedance Concentration BaP TEQ (1.5 ppm)	Proposed Excavation Depth (ft)
Harriman Park					
1	4509 37 th St. N	Front Yard	-	8.5	1
2	3637 44 th Ave. N	Back Yard	-	3.4	1
		Left Yard		8.5	1

3	3669 43 rd Ave. N.	Dripline	-	3.9	1
4	3554 41 st Ave. N	Garden	-	1.7	2
Collegeville					
5	4024 FL Shuttlesworth Dr.	Back Yard	-	15	1
6	3472 33 rd St. N	Garden	-	13	2
7	3144 34 th Terrace Pl. N.	Front Yard	-	2.4	1
8	3145 34 th Terrace Pl N	Back Yard	-	14	1
		Left Yard*		16	1
9	3137 34 th Terrace Pl. N.	Front Yard	-	4.8	1
		Left Yard		3.5	1
10	3460 31 st Way N	Front Yard	-	2.6	1
11	3145 34 th Ct. N.	Front Yard	-	2.0	1
12	3389 33 rd St. N.	Front Yard	-	12	1
13	3409 31 st Way N.	Back Yard	-	2.3	1
14	3441 31 st St N	Front Yard *	-	15	1
15	3452 30 th Way N	Front Yard	38	-	1
16	3456 30 th Way N.	Front Yard	38	-	1
17	3347 30 th Pl. N	Front Yard	-	1.7	1
18	3361 31 st St N.	Back Yard	-	7.9	1
		Front Yard		5.9	1
19	3377 33 rd Pl. N	Back Yard	-	3.5	1
		Right Yard		4.1	1
20	3369 33 rd Pl. N.	Back Yard	-	3.4	1

21	3364 34th St. N	Back Yard	-	3.3	1
		Front Yard		11	1
22	3360 34th St. N.	Back Yard *	-	8.2	1
		Dripline	-	2.3	1
		Garden	40	3.0	2
23	3348 34th St. N	Front Yard	-	6.0	1

Notes:

BaP TEQ = benzo(a)pyrene toxic equivalents

ft = feet

ppm = parts per million

* Location selected for post-excavation sampling (refer to Section 3.4).

3. SOIL REMEDIAL ACTIONS

MGM11-WALTERCOKE/SOIL RA\RAWP_EPAFINAL_0623.DOCX 3-4

ES042111223127MGM

Table 9

Address: Hudson School, Birmingham, Alabama
2009 Sampling Data

Sample Designation and Location: OSS-10	Arsenic Concentration (mg/kg) (soil)	Arsenic Cleanup Level (mg/kg)	Benzo(a)pyrene (BaP TEQ) Concentration (mg/kg) (soil)	Benzo(a)pyrene (BaP TEQ) Cleanup Level (mg/kg)
Front yard	15.0 mg/kg	37 mg/kg	39.30 mg/kg	1.5 mg/kg
Side yard left	14.0 mg/kg	37 mg/kg	29.07 mg/kg	1.5 mg/kg
Sub:BA	17.0 mg/kg	37 mg/kg	0.812 mg/kg	1.5 mg/kg
Sub:BB	18.0 mg/kg	37 mg/kg	0.629 mg/kg	1.5 mg/kg
Sub:BC	7.4 mg/kg	37 mg/kg	0.650 mg/kg	1.5 mg/kg
Sub:BD	8.3 mg/kg	37 mg/kg	0.926 mg/kg	1.5 mg/kg
Play area-composite	30.0 mg/kg	37 mg/kg	2.621 mg/kg	1.5 mg/kg
Play Area-Grab	38.0 mg/kg	37 mg/kg	7.275 mg/kg	1.5 mg/kg

Table 10

Address: Hudson School, Birmingham, Alabama
August 2010

Sample Designation and Location: OSS-0810 (Resampling after construction of new school)	Arsenic Concentration (mg/kg) (soil)	Arsenic Cleanup Level (mg/kg)	Benzo(a)pyrene (BaP TEQ) Concentration (mg/kg) (soil)	Benzo(a)pyrene (BaP TEQ) Cleanup Level (mg/kg)
Front R1	14.0 mg/kg	37 mg/kg	1.660 mg/kg	1.5 mg/kg
Front R2	16.0 mg/kg	37 mg/kg	0.970 mg/kg	1.5 mg/kg

Front R3	14.0 mg/kg	37 mg/kg	0.350 mg/kg	1.5 mg/kg
Front R4	13.0 mg/kg	37 mg/kg	1.468 mg/kg	1.5 mg/kg
Front R5	19.0 mg/kg	37 mg/kg	1.200 mg/kg	1.5 mg/kg
Front RC	18.0 mg/kg	37 mg/kg	2.550 mg/kg	1.5 mg/kg
B-C	16.0 mg/kg	37 mg/kg	0.530 mg/kg	1.5 mg/kg
FA-C	7.6 mg/kg	37 mg/kg	1.220 mg/kg	1.5 mg/kg
FB-C	11.0 mg/kg	37 mg/kg	0.960 mg/kg	1.5 mg/kg
P1-C	20.0 mg/kg	37 mg/kg	0.760 mg/kg	1.5 mg/kg
LA-C	13.0 mg/kg	37 mg/kg	0.860 mg/kg	1.5 mg/kg
P2-1	15.0 mg/kg	37 mg/kg	1.850 mg/kg	1.5 mg/kg
P2-2	17.0 mg/kg	37 mg/kg	29.000 mg/kg	1.5 mg/kg
P2-3	18.0 mg/kg	37 mg/kg	6.090 mg/kg	1.5 mg/kg
P2-4	22.0 mg/kg	37 mg/kg	1.390 mg/kg	1.5 mg/kg
P2-5	16.0 mg/kg	37 mg/kg	1.880 mg/kg	1.5 mg/kg
LB-C	13.0 mg/kg	37 mg/kg	1.020 mg/kg	1.5 mg/kg
P3-1	23.0 mg/kg	37 mg/kg	0.400 mg/kg	1.5 mg/kg
P3-2	20.0 mg/kg	37 mg/kg	6.360 mg/kg	1.5 mg/kg
P3-3	23.0 mg/kg	37 mg/kg	3.790 mg/kg	1.5 mg/kg
P3-4	24.0 mg/kg	37 mg/kg	1.780 mg/kg	1.5 mg/kg
P3-5	23.0 mg/kg	37 mg/kg	3.790 mg/kg	1.5 mg/kg
P4-C	18.0 mg/kg	37 mg/kg	0.660 mg/kg	1.5 mg/kg
P5-C	20.0 mg/kg	37 mg/kg	0.220 mg/kg	1.5 mg/kg
P6-C	N/A	37 mg/kg	0.700 mg/kg	1.5 mg/kg
P7-C	21.0 mg/kg	37 mg/kg	0.340 mg/kg	1.5 mg/kg
P8-C	14.0 mg/kg	37 mg/kg	0.660 mg/kg	1.5 mg/kg

Table 11

Address: Former Carver High School, Birmingham, Alabama
2009 Sampling Data

Sample Designation and Location: OSS-32	Arsenic Concentration Sieved (mg/kg) (soil)	Arsenic Cleanup Level (mg/kg)	Benzo(a)pyrene (BaP TEQ) Concentration (mg/kg) (soil)	Benzo(a)pyrene (BaP TEQ) Cleanup Level (mg/kg)
Front yard	14.0 mg/kg	37 mg/kg	6.992 mg/kg	1.5 mg/kg
Sub: BA	5.6 mg/kg	37 mg/kg	0.075 mg/kg	1.5 mg/kg
Sub: BB	15.0 mg/kg	37 mg/kg	1.890 mg/kg	1.5 mg/kg
Sub: BC	15.0 mg/kg	37 mg/kg	2.892 mg/kg	1.5 mg/kg
Sub: BD	20.0 mg/kg	37 mg/kg	1.705 mg/kg	1.5 mg/kg
Sub: BE	6.0 mg/kg	37 mg/kg	0.055 mg/kg	1.5 mg/kg
Sub: BF	16.0 mg/kg	37 mg/kg	1.022 mg/kg	1.5 mg/kg
Sub: BG	36.0 mg/kg	37 mg/kg	0.266 mg/kg	1.5 mg/kg
Sub: BH	46.0 mg/kg	37 mg/kg	0.216 mg/kg	1.5 mg/kg
Sub: BI	12.0 mg/kg	37 mg/kg	0.607 mg/kg	1.5 mg/kg
Sub: BJ	29.0 mg/kg	37 mg/kg	1.052 mg/kg	1.5 mg/kg
Sub: BK	18.0 mg/kg	37 mg/kg	2.554 mg/kg	1.5 mg/kg
Sub: BL	14.0 mg/kg	37 mg/kg	2.039 mg/kg	1.5 mg/kg

Table 12

Address: Riggins School, Fairmont, Birmingham, Alabama
2009 Sampling Data

Sample Designation	Arsenic Concentration	Arsenic Cleanup	Benzo(a)pyrene (BaP TEQ)	Benzo(a)pyrene (BaP TEQ)
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and Location: OSW-8	(mg/kg) (soil)	Level (mg/kg)	Concentration (mg/kg) (soil)	Cleanup Level (mg/kg)
Sub: B1	8.8 mg/kg	37 mg/kg	10.673 mg/kg	1.5 mg/kg
Front yard	8.5 mg/kg	37 mg/kg	9.985 mg/kg	1.5 mg/kg
Sub: B2	8.5 mg/kg	37 mg/kg	12.913 mg/kg	1.5 mg/kg
Sub: P1	8.9 mg/kg	37 mg/kg	3.54 mg/kg	1.5 mg/kg
Sub: P2	9.4 mg/kg	37 mg/kg	0.936 mg/kg	1.5 mg/kg
Sub: P3	12.0 mg/kg	37 mg/kg	0.122 mg/kg	1.5 mg/kg
Sub: P4	9.6 mg/kg	37 mg/kg	0.238 mg/kg	1.5 mg/kg
Sub: P5	7.3 mg/kg	37 mg/kg	0.096 mg/kg	1.5 mg/kg
Sub: P6	8.1 mg/kg	37 mg/kg	1.654 mg/kg	1.5 mg/kg
Sub: P7	4.9 mg/kg	37 mg/kg	0.097 mg/kg	1.5 mg/kg
Sub: P8	8.4 mg/kg	37 mg/kg	0.125 mg/kg	1.5 mg/kg
Sub: P9	7.9 mg/kg	37 mg/kg	0.125 mg/kg	1.5 mg/kg
Dripline 1	8.5 mg/kg	37 mg/kg	460.1 mg/kg	1.5 mg/kg
Dripline 2	20.0 mg/kg	37 mg/kg	982.2 mg/kg	1.5 mg/kg
Dripline 3	13 mg/kg	37 mg/kg	705.1 mg/kg	1.5 mg/kg
Dripline 4	8.7 mg/kg	37 mg/kg	651.6 mg/kg	1.5 mg/kg

It should be noted that Hudson School and Riggins School impacted soils have been removed and replaced with clean soil and sod in 2011.

The exposure pathway to residences is complete.

Groundwater.

In the Phase III RFI Report, a monitoring well located in Harriman Park, MW-50, detected benzene (21 ug/L) (MCL 5 ug/L), BaP (.14J ug/L), Phenol (6 ug/L), Chlorobenzene (6.7 ug/L), Vinyl Chloride (130 ug/L) (MCL 2 ug/L), trans 1,2 DCE (8.6 ug/L) and selenium 6.8J ug/L.

While the groundwater is contaminated from releases from the former Chemical Plant to offsite groundwater there are no existing public water wells within a two-mile radius of the site (Benny Laughlin, ADEM, June 20, 2005). Additionally, no private water wells are known to exist within one mile of the site. Therefore, no current exposure points in groundwater were identified in the vicinity of the site. Walter Coke has not conducted a door to door survey to determine if there are any private water well users.

Since the groundwater is not used as a drinking water source the exposure pathway is not complete.

Ambient Air. Exposure points were identified in ambient air at off-site residences as a result of fugitive dust emissions on properties where surface soil is impacted. Based on the max and mean air monitoring data for benzene, all monitors exceed the PRG. The air monitoring data for Sloss (SIAL) exceeds the $1E^{-4}$ risk based on the max concentration.

Jefferson County Department for Health collected air monitoring data from 2005 to 2006 at the Shuttlesworth Avenue air monitoring station (SIAL) (BAT 2009). The air monitoring station is 20 meters from Walter Coke's truck entrance. The air quality at the monitoring station is indicative of ambient air conditions off-site. The data indicates that particulates contain arsenic, benzo(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene, and benzene from Walter Coke. EPA's Technical Services Section performed a preliminary risk assessment and determined that arsenic is in concentrations of 10^{-5} risk range. The PRG for arsenic is $4.5E^{-4}$ ug/m³. Benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene are present at the 10^{-6} risk range. Benzo(a)pyrene exceed the 10^{-5} risk range for cancer (See Table 13).

PAH Air Monitoring Data (Jefferson County Department for Health) for Walter Coke:

Table 13

Walter Coke	Analyte	ng/m ³ air	MAX	MEAN
	Benzo(a)anthracene [B(a)A]	ng/m ³ air	21.9	3.153
	Benzo(a)pyrene [B(a)P]	ng/m ³ air	15.3	1.988
	Dibenz(a,h)anthracene [D(a,h)A]	ng/m ³ air	2.45	0.433

Table 13 Cont.

Walter Coke	Analyte	MAX	ug/m3	R9 PRGs	Exceed the PRGs
	B(a)A	21.9	2.19E-02	9.20E-03	YES
	B(a)P	15.3	1.53E--02	9.20E-04	YES
	B(a,h)A	2.45	2.45E-03	9.20E-04	YES

Table 13 Cont.

Walter Coke	Analyte	MAX	1.00E-05	Exceed 1E-5
	B(a)A	21.9	9.20E-02	NO
	B(a)P	15.3	9.20E-03	YES
	D(a,h)A	2.45	9.20E-03	NO

Table 13 Cont.

Walter Coke	Analyte	Mean	ug/m3	R9 PRG	Exceed PRG	1.00E-05	Exceed 1E-5
	B(a)A	5.43	5.43E-03	9.20E-03	NO	9.20E-02	NO
	B(a)P	4.04	4.04E-03	9.20E-04	YES	9.20E-03	NO
	D(a,h)A	1.66	1.66E-03	9.20E-04	YES	9.20E-03	NO

The Walter Coke air monitoring station is not across from the coal pile raw material areas. Residences across from the coal piles complain of black dust accumulations on automobiles and inside homes on window ledges. It is expected that ambient air conditions during windy conditions above 11 mph may yield a higher particulate count across from the coal piles.

Air Monitoring Support for Off-Site Migration

The RCRA Program received a copy of the Birmingham Air Toxic Report from Jefferson County Health Department dated *February 2009*. The study detected arsenic, benzo(a)pyrene, naphthalene, acrolein, acetonitrile and etc. On February 4, 2006, total concentration of PAHs was detected at 1,500 ug/m³.

The Birmingham Air Toxic Report dated *February 2009*, described the air toxic study conducted at four air monitoring stations in north Birmingham. The constituents of interest were volatile organic compounds, semi-volatile organic compounds, carbonyls, metals including hexavalent chromium. A total of 102 air pollutants were sampled and analyzed. The study evaluated chronic exposure, assuming 24 hours a day of exposure for 70 years and acute exposure over a 1 hour exposure period. The 95% Upper Confidence Level was used as a conservative estimate for chronic exposure. For acute exposure maximum air concentration was compared to screening levels. The toxicity criteria were derived from the Office of Air Quality, Planning and Standards (OAQPS). Benzene is regulated under National Emission Standard (NESHAP). $1E-4$ is the appropriate upper limit of acceptability and a cancer risk of one in a million ($1E-6$) to be safe with an ample margin.

Jefferson County Department of Health concluded the following regarding toxic chemicals detected at the Shuttlesworth Air Monitoring Station: 1) The air monitoring results indicate the chemical present in the air exceed a $1E-6$ cancer *cumulative* cancer risk at $1.66E-4$; 2) The highest *chronic* cancer risk for a single chemical detected in the study was at the Shuttlesworth Air Monitoring Station for benzene was $6.4E-5$; 3). The following chemicals were potential risk drivers: 1,3 butadiene, acetaldehyde, arsenic, benzene, benzo(a)pyrene, beryllium, carbon tetrachloride, hexavalent chromium, naphthalene, p-dichlorobenzene, and tetrachloroethylene; 4) The *non-cancer* health Hazard Index (HI) for the Shuttlesworth Air Monitoring Station is 127.0 (Exceeding an HI of 1.0 indicates a probable health hazard.) The primary constituents constituting a non-cancer health hazard are acrolein, manganese, and acetonitrile; and 5) Only one chemical, benzene, was detected at *acute* health concentrations. The acute hazard index (HI) of 1 was exceeded at 1.09 at a concentration of 31.54 ug/m^3 on February 4, 2006. The acute bench mark for benzene is 0.029 mg/m^3 which come from the Agency for Toxic Substances Disease Registry (ATSDR) minimum risk level for no adverse effects for 1 to 14 day exposures.

Indoor Air. VOC plumes in groundwater are known to be present off-site but it is not currently known if VOCs are near residents; therefore, no off-site indoor air exposure points were identified.

The exposure pathway from vapor intrusion to indoor air from contaminated groundwater is not currently complete.

The JCDH air monitoring station on Shuttlesworth Drive in Harriman Park detected benzene in the ambient air 10^{-4} risk in the maximum concentration. It is possible that benzene may enter the indoor air through windows or the ventilation system. Also, particulates containing PAHs and arsenic detected in ambient air samples would impact indoor air through open windows and doors. Residences have stated that fine black dust accumulates on the window seals inside the homes.

The exposure pathway to indoor air from ambient air is complete.

Surface Water. Five Mile Creek is located adjacent to the site. Surface water in the creek is likely impacted directly by the SWMUs via overland flow during high discharge from the Storm Water Ditch. Although there are no surface water intakes for drinking water in the vicinity of the site, it is likely that fishing occurs by local residents. Therefore, exposure points were identified in Five Mile Creek for local fishers (residents) and a potential exposure at LaFarge Quarry Lake (residents).

There is a potential for groundwater releases via direct discharge and seeps (along steep quarry walls) to the lake in the LaFarge Quarry adjacent to the site. Bait buckets were identified at the edge of the lake. Therefore, there is a potential for exposure to fishers in the quarry lake if the water has been impacted.

The Phase III RFI Report Table 5-6 for the Lafarge Quarry Surface Water data reported iron, manganese, and selenium above screening levels.

Table 5-7 of the same report for surface water in Five Mile Creek reported that the tap water screening level was exceeded for antimony, arsenic, cobalt, thallium, naphthalene, bis(2-ethylhexyl)phthalate, benzene above tap water screening levels.

The exposure pathway to surface water in Five Mile Creek and LaFarge Quarry is complete for recreational exposure to dermal contact and ingestion.

The surface water in the Harriman Park Ditch is accessible to residents. Surface water samples were not taken.

Sediment. Sediments in Five Mile Creek are expected to be impacted directly by site SWMUs via overland flow from the storm water ditch and from historical releases. The creek has received discharge from a drainage ditch that traverses the site. The drainage ditch next to BTF area is impacted with PAHs and the fines in the sediment are expected to be mobile. Walter Coke took two sediment samples downstream of the facility in Five Mile Creek and one sample at the outfall. The most down stream sample was taken 2,000 feet downstream. EPA noted that the substrate for Five Mile Creek was primarily of cobbles and few areas were noted where fine grain samples could be acquired. Consequently, only two samples were collected down stream of the outfall FMCSS #1 with concentrations of PAHs constituents BaA (1.5 mg/kg), BaP (2.1 mg/kg), BbF (2 mg/kg), DbA (.38 mg/kg) and FMCSS #2 BaA (6.2 mg/kg), BaP (9.0 mg/kg), BbF (9.8 mg/kg), DbA (2.2 mg/kg) and IdP (2.3 mg/kg). An outfall sediment sample detected PAH constituents BaA (10 mg/kg), BaP (11.0 mg/kg), BbF (12 mg/kg), DbA (2.7 mg/kg) and IdP (3.9 mg/kg). Both FMCSS #2 and the outfall sediment detected BaP TEQ in excess of the 10^{-4} risk based cleanup level of 1.5 mg/kg. In addition, in November of 2006, coal tar was identified ½ mile downstream of Walter Coke in gravel bars of Five Mile Creek. The presence of coal tar in Walter Coke's storm water ditch indicates that the facility is the likely source for coal tar identified in Five Mile Creek.

The most downstream sample was taken in 2005 was 1,700 feet downstream (COED, Figure 5-1). EPA noted that the substrate for Five Mile Creek was primarily of cobbles and few areas were noted where fine grain samples could be acquired. Consequently, only two samples were collected downstream of the outfall, FMCSS #1 with concentrations of PAHs constituents benzo(a)anthracene (BaA) (1.5 mg/kg), benzo(a)pyrene BaP (2.1 mg/kg), benzo(b)fluoranthene (BbF) (2 mg/kg), Dibenzo(a,h)anthracene (DbA) (.38 mg/kg) and FMCSS #2 BaA (6.2 mg/kg), BaP (9.0 mg/kg), BbF (9.8 mg/kg), DbA (2.2 mg/kg) and Indeno(1,2,3-cd)pyrene (IdP) (2.3 mg/kg). An outfall sediment sample FMCSS #3 detected PAH constituents BaA (10 mg/kg), BaP (11.0 mg/kg), BbF (12 mg/kg), DbA (2.7 mg/kg) and IdP (3.9 mg/kg). Both FMCSS #2 and the outfall sediment detected BaP TEQ in excess of the 10^{-4} risk based cleanup level of 1.5 mg/kg. In addition, in November of 2006, coal tar was identified ½ mile downstream of Walter Coke in gravel bars of Five Mile Creek.

The presence of coal tar in Walter Coke's storm water ditch indicates that the facility is the likely source for coal tar identified in Five Mile Creek. Sediments from the ditch were analyzed for PAHs during June 1995 sampling in the following samples: SD-2 BaA (74 mg/kg), BaP (82 mg/kg), BbF (100 mg/kg), BkF (130 mg/kg), chrysene (C) (69 mg/kg). SD-4 BaA (59 mg/kg), BaP (54 mg/kg), BbF (65 mg/kg), BkF (17 mg/kg), DbA (9.1 mg/kg), IdP (25 mg/kg), Naphthalene (9.6 mg/kg). Solidified coal tar was also observed in the ditch.

The Phase III RFI Report (2009) required additional sampling of Five Mile Creek and an investigation of the coal tar deposits identified. Sampling indicated that high levels of PAHs were present in the coal tar (Table 13). PAHs were present above cleanup levels of 1.5 mg/kg in Five Mile Creek sediments (Table 14).

Solidified coal tar samples when broken up create a sheen on the water as observed by EPA. Analytical results for coal tar samples from Table F-1 of the Phase III RFI Report are summarized for carcinogenic compounds as follows:

Table 14

Chemical	FMC 07 1T (mg/kg)	FMC 07 2T (mg/kg)	FMC 07 3T (mg/kg)	FMC 07 4T (mg/kg)	FMC 07 5T (mg/kg)	FMC 07 6T (mg/kg)
BaA	210	290	500	1,700	320	1,700
BaP	130	180	290	980	210	1,200
BbF	180	240	420	1,300	260	1,500
BkF	72	89	150	500	110	610
Chrysene	200	280	320	2,100	300	1,500
DbA	23	12	58	250	47	210
IdP	41	57	140	520	71	680

Benzo(a)pyrene was detected in Five Mile Creek sediments from 2 mg/kg to 21 mg/kg in sediments above residential cleanup levels for soil at 1.5 mg/kg (Table 15). The sediment concentrations:

Table 15

Chemical	FMC-SD 003 (mg/kg)	FMC-SD 004 (mg/kg)	FMC-SD 005 (mg/kg)	FMC-SD 006 (mg/kg)	FMC-SD 007 (mg/kg)
BaA	5.2	3.6	31	12	2
BaP	5.8	3.1	21	9.7	2
BbF	7.3	3.8	26	13	2.2
BkF	2.2	1.5	11	3.9	0.86
Chrysene	5.9	4.0	36	13	2.4
DbA	1.2	0.64	6	2.2	0.42
IdP	3.3	1.6	13	4.8	1

The exposure pathway to recreational users is complete.

Drainage Ditch along 35th Avenue-Shuttlesworth Drive

Walter Coke sampled the soil in the ditch along 35th Avenue/Shuttlesworth Drive adjacent to the facility boundary. Samples were spaced 800 to 1,000 feet apart. The ditch is located outside the fence and between the road and is therefore accessible to residents across the street in Harriman Park and Collegeville. COEID sampling in 2005 indicated that PAHs are above current residential cleanup levels of 1.5 mg/kg. The concentration of sediment samples are as follows: 35SS #2 BaA (14 mg/kg), BaP (20 mg/kg), BbF (30 mg/kg), BkF (9.8 mg/kg), DbA (5.6 mg/kg), and IdP (11 mg/kg). 35SS #4, BaP (2.8 mg/kg), BbF (3.5 mg/kg), DbA (.92 mg/kg), and IdP (1.2 mg/kg).

There are no barriers to the public and the exposure pathway is complete.

Harriman Park Ditch

Table 5-8, of the Phase III RFI Report reported that sediment in the Harriman Park Ditch contained metals that exceeded screening levels for residential soil. Metals detected were aluminum, cobalt, iron, manganese, and mercury. PAHs were analyzed for surficial sediment. BaP TEQ for HPD-SD001 (1.1 mg/kg), HPD-SD002 (1.0 mg/kg), HPDSD-003 (1.1 mg/kg). The ditch is accessible to residents and the exposure pathway is complete.

Table 16
Complete Exposure Pathways

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Rationale for Complete Exposure Pathway
Current and Future	Soil	Surface Soil (0-1 Foot)	Onsite surface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Industrial Worker	Adult	Dermal, Ingestion, Inhalation	Industrial workers may contact COPCs in surface soil during work activities. Windblown soil believed to be contaminated presents a complete pathway. Site H/S Plan and PPE should minimize exposure to normal soil contact..
				Trespasser	Adolescent	Dermal, Ingestion, Inhalation	Occasional trespassers may contact COPCs in surface soil in the Land Disposal Area and the exposure pathway is complete.
Current and Future	Bank soil	Bank soil (0-1 foot)	Bank soil along Five Mile Creek	Recreator	Adult/ Adolescent/ Child	Dermal, Ingestion	Recreators may contact COPCs in bank soil and the pathway is complete.
Current and Future	Sediment	Sediment (0-1 foot)	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/ child	Dermal, Ingestion, Inhalation	A fence encloses most of the ditch. However, the outfall into Five Mile Creek is not fenced. Occasional trespassers may contact COPCs (PAHs) in ditch. The exposure pathway is complete.
Current and Future	Sediment	Sediment	Harriman Park	Recreator	Adult/child	Dermal,	Recreators may

		(0-6 inches)	Ditch			Ingestion,	contact COPCs in sediment not covered by surface water. The exposure pathway is complete.
Current and Future	Surface water	Surface water	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Occasional trespassers may contact COPCs in ditch. Exposure pathway complete.
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Exposure pathway complete.
Current and Future	Surface water	Surface water	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion, Inhalation	Recreators may contact COPCs with surface water.
Current and Future	Surface water	Surface water	Five Mile Creek	Recreator	Adult/Adolescent/Child	Dermal, Ingestion,	Recreators may contact COPCs with surface water during recreational activities. Pathway complete.
Current and Future	Surface water	Surface water	LaFarge Quarry Lake	Mining Worker/Trespasser	Adult/Adolescent/Child	Dermal, Ingestion,	Mine workers and Trespassers may contact COPCs with surface water during recreational activities. Pathway complete.
Current and Future	Food	Fish	LaFarge Quarry	Recreator	Adult/Adolescent/	Ingestion	Recreators may ingest COPCs with in fish caught in quarry lake if bioaccumulative chemicals are present. Fish tissue should be analyzed for metals. Currently not complete.
Current and Future	Food	Fish	Five Mile Creek	Recreator	Adult/Adolescent/Child	Ingestion	Recreators may ingest COPCs with in fish caught in Five Mile Creek if bioaccumulative chemicals are present. Fish tissue should be analyzed for COPCs. Exposure

							pathway may not be complete.
Current and Future	Groundwater	seeps	LaFarge quarry walls	Mining worker	Adult	Ingestion	Exposure pathway is likely incomplete to mining workers.
Current and Future	Indoor air	Indoor air (onsite)	Indoor air (onsite)	Industrial worker/office worker	Adult	Inhalation	Industrial workers and office workers may inhale volatile COPCs in IVAL in the Coke Plant. Exposure pathway is complete without air monitoring.
Current and Future	Ambient air	Ambient air (onsite)	Ambient air across the site where there are impacted soils.	Workers	Adult	Inhalation	Industrial workers and office workers may inhale volatile COPCs in vapor and dust from surface soil. Exposure pathway is complete for workers.
				Trespassers	Adult/Adolescent/Child	Inhalation	
Current and Future	Soil	Subsurface soil (2-10 Feet)	Onsite subsurface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Construction Workers	Adult	Dermal, Ingestion and Inhalation	Construction workers may contact COPCs in subsurface soil. Exposure pathway is not complete if PPE is used.
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25 SWMU 13 SWMU 22	Construction Workers	Adult	Dermal/Ingestion/Inhalation	Construction workers may contact drainage ditch sediment during construction activities. Exposure pathway is not complete.
Current and Future	Sediment	Sediment	SWMU 25 SWMU 13 SWMU 22	Trespasser	Adult	Dermal/Ingestion/Inhalation	Trespassers may contact drainage ditch sediment in SWMU 25. Exposure pathway is not complete at SWMU 13 and SWMU 22 as the area is fenced.
Current and Future	Surface	Surface water	SWMU 13.	Construction	Adult	Dermal	Construction

	water		SWMU 22 and drainage ditch next to BTF Area	Workers			workers may contact surface water during construction activities. Exposure pathway is not complete if PPE is used.
Current and Future	Groundwater	Ambient Air (onsite)	Ambient air at Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Inhalation	Construction workers may inhale COPCs volatilized into the ambient air from shallow groundwater plumes. Exposure pathway is not complete if PPE is used.
Current and Future	Groundwater	Shallow groundwater (onsite)	Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Dermal	Construction workers may contact COPCs in ditches from shallow groundwater plumes. Exposure is not complete if PPE is used.
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Dermal, Ingestion	Groundwater is not used as a potable source. Exposure pathway is not complete.
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Inhalation	Groundwater is not used as a potable source. Exposure pathway is not complete.
Current and Future	Soil	Soil	Residential properties and schools (offsite)	Residents, students, teachers	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may come into contact with COPC while gardening, play in the soil. There is a complete pathway.
Current and Future	Sediment	Sediment	Sediment in ditch outside fence line of Walter Coke Property next to Shuttlesworth and 35 th Avenue.	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may come into contact with COPC while walking along fence line. COPC exceed soil residential soil screening levels. There is a complete pathway.

Current and Future	Food	Food	Residents (offsite)	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/	Residents may come into contact with COPC while eating vegetables grown in impacted soil if there is bio uptake of the COPCs of impacted soil in gardens. There is a complete pathway if vegetables are not properly washed.
Current and Future	Ambient air	Air	Residents	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may breath, eat, and be covered in contaminated dust blown into neighborhoods. The pathway is complete.
Current and Future	Ambient Air	Groundwater to Vapor Intrusion to Indoor Air	Residents	Residents	Children/ Adolescent/ Adults	Inhalation	If a residential home or school is located within 100 feet of a residences then there may be a complete pathway. There does not appear to be a complete pathway at this time.
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Ingestion	Well water is not in use onsite or offsite. Exposure pathway is not complete.
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Inhalation/ Ingestion/ Dermal	Well water is not in use onsite or offsite. Exposure pathway is not complete.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRAInfo code (CA 725)

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

- _____ If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- X If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- _____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code.

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

Rationale and Reference(s):

Onsite Exposures to Contamination

Site Workers

Soil

Surficial soils contain arsenic above cancer endpoint for an industrial setting of 160 mg/kg and PAHs above industrial screening levels and 10⁻⁴ risk based cleanup level. The soil pathway onsite is complete if inhaled or ingested. Walter Coke has health and safety policy for site workers requiring PPE limiting exposure to soil. Exposure to soil is not thought to be significant.

Air

Hazardous constituents are present in surficial soil above screening levels. The site workers do not wear respiratory protection except in designated areas. Even though Walter Coke uses various dust suppression techniques to mitigate fugitive dust emissions from the site there is a complete pathway for inhalation and ingestion of site specific hazardous constituents from windblown particulates. The Occupational Health and Safety Administration (OSHA) regulate exposure to chemicals in the work place. It is not known if the exposure is significant.

Indoor Air

COPCs are present in the groundwater under the Coke Plant at levels that would exceed the indoor air vapor intrusion screening levels. COCPs need to be quantified in the Coke Plant work space. Exposure is thought to be significant based on concentrations of VOCs in ground water.

Surface Water

COPCs are present in the storm water ditches and impoundments. Walter Coke has health and safety policy for site workers requiring PPE. Exposure to surface water is not thought to be significant for site workers and construction workers.

Groundwater

COPCs are present in the groundwater in the Coke Plant, former Chemical Plant, Land Disposal Areas, and BTF Area. However, there is no significant exposure since groundwater is not used for drinking. Walter Coke has health and safety (H/S) policy for site workers requiring PPE. Construction workers would follow H/S policy. Exposure to groundwater is significant.

Sediment

Hazardous constituents are present in sediments onsite at SWMU #13, SWMU#22, SWMU #25 and drainage ditch next to the BTF Area and ditch next to SWMU #39. For site workers and construction workers following the Health and Safety Plan and use of PPE in impacted areas including gloves exposure to impacted sediments is thought to not be significant.

Trespassers

Soil

Surficial soils are contaminated with COPCs above industrial screening levels in the former Chemical Plant, Coke Plant, and BTF Area. A fence is present to prevent site access. Exposure is not thought to be significant.

Soils in the Land Disposal Area are contaminated and accessible through the LaFarge Quarry entrance. Exposure to impacted surficial soils would be significant to a trespasser.

Air

Walter Coke uses various dust suppression techniques to mitigate fugitive dust emissions on site. There is a complete pathway for inhalation and ingestion of site specific hazardous constituents from windblown particulates onsite. A fence prevents access to the site and prevents inhalation exposure onsite to trespassers in the Former Chemical Plant, BTF Area, and Coke Plant. Exposure to air onsite is not significant to trespassers.

Even though the Land Disposal Area is accessible to trespassers the exposure pathway to air is not significant for trespassers since the waste piles/landfills are covered in grass and hazardous constituents are less mobile during windy conditions.

Surface Water

COPCs are present in the surface water in the storm water ditches and impoundments.

Benzene has been detected above the MCL in the surface water. Site access is controlled by a fence and there would be no exposure to trespassers to SWMU #22 and SWMU #13. However, storm water in SWMU #25 is accessible through the LaFarge Quarry entrance to the Land Disposal Area. Due to the low concentrations of VOCs in the surface water, at the MCL, exposure is not thought to be significant for infrequent exposure.

Surface water from the ditch next to BTF Area is accessible at the confluence with Five Mile Creek. Historically, cyanide has been below the tap water screening levels in surface water. Exposure is not considered significant.

Sediment

A fence generally controls accesses to areas onsite where impacted sediment is present. The exception is at the confluence of the storm water drainage ditch and Five Mile Creek. PAHs exceed residential screening levels and EPA's cleanup levels. There are no signs warning of hazardous constituents in this area. Exposure potential to impacted sediment is significant.

In addition, sediment is impacted in the ditch next to the BTF Area adjacent to Summit Drive and is accessible to the public. The areas described may be on Walter Coke property but access is uncontrolled and there are no signs warning the public of hazardous constituents in sediments. Based on the high concentration of PAHs in the sediment the exposure potential is significant.

Sediment in SWMU #13 and SWMU #22 are impacted with PAHs above screening levels. The BTF Area is fenced off and trespassers do not have access to sediment in the impoundments. The exposure pathway is not significant.

Trespassers will have access to contaminated sediment in SWMU #25. Even though the sediment is covered with water the exposure pathway is significant if in contact with sediment.

Groundwater

COPCs are present in groundwater above the MCL or tap water standards. Trespassers have no access to groundwater onsite. The exposure is not significant.

Offsite Exposure to Contamination

Soil

Residential soil concentrations exceeding 10^{-4} BaP TEQ are **significant and unacceptable** warranting remedial action. Soil concentrations of 23 residential properties exceeded the 10^{-4} cleanup level for BaP TEQ and/or inorganic arsenic a hazard index (HI) of 1 at 37 mg/kg. The 10^{-4} cleanup level was exceeded for BaP at the Riggins School in the Fairmont, Hudson School and Former Carver High School in the Collegeville community. Also, off-site inorganic arsenic concentrations in surface soil exceeded the HI risk-based cleanup level of 37 mg/kg in three residences of Collegeville.

Eight properties have been cleaned up to EPA's established cleanup level of 1.5 mg/kg for BaP TEQ for residential soils. Two school properties (Riggins School and Hudson School) have also been cleaned up. The pathway for BaP TEQ from the soil to humans is not complete at the

eight residential properties and two schools as of 2011. The exposure pathway is significant to residences at the remaining residential properties that exceed 1E-4 for BaP TEQ and 37 mg/kg for arsenic. The former Carver High School exceeds cleanup levels for BaP and arsenic. The school is presently fenced and the property is vacant. Exposures are not considered to be present at this time.

Ambient Air

The inhalation pathway for hazardous constituents consisting of benzene, PAHs, arsenic and other compounds to residents across the street in Harriman Park, Collegeville and Fairmont communities is complete. These constituents have been detected in the air monitoring station across street from Walter Coke in Harriman Park.

Historically there has been significant, short duration, exposure potential to benzene in the air in the Harriman Park community. EPA's most recent assessment is that releases to air are within the acceptable risk range.

Surface Water

Recreators may come into contact with surface water on Five Mile Creek that contains hazardous constituents.

Table 5-7 of the Phase III RFI Report for surface water in Five Mile Creek reported that the tap water screening level was just exceeded for antimony, arsenic, cobalt, thallium, naphthalene, bis(2-ethylhexyl)phthalate, benzene above tap water screening levels. Based on the exceedance of screening levels in one sample in seven the exposure is thought to not be significant.

No surface water samples were taken in the Harriman Park Ditch.

Surface water is impacted at the LaFarge Quarry Lake and seeps with metals above screening levels. The quarry is active and even though there is a complete pathway to recreators who might swim or fish and site workers the exposure is not significant.

Sediment

Harriman Park Ditch sediment contains metals (Table 5.8). Screening levels were exceeded for five metals (Aluminum, Cobalt, Iron, Manganese, and Mercury).

In sediments PAHs exceeded the screening level but were below cleanup levels for BaP TEQ. BaP TEQ for HPD-SD001 (1.1 mg/kg), HPD-SD002 (1.0 mg/kg), HPDSD-003 (1.1 mg/kg).

Exposure is thought to not be significant for incidental exposure to sediments in the ditch. BaP TEQ is below 1.5 mg/kg residential cleanup level at 1E-4 risk.

Five Mile Creek sediments contain PAHs and solidified coal tar above residential cleanup levels (Tables 13 and 14). When the solidified coal tar is broken a sheen is present on the surface of the water. Based on the high concentrations of PAHs in the coal tar and sediment the exposure pathway is significant.

Storm Water Ditch outside Walter Coke fence line and along 35th Avenue and Shuttlesworth Drive are impacted with BaP TEQ above residential cleanup levels of 1.5 mg/kg. The ditch is accessible to the public and exposure is considered significant.

Table 17
Significant Exposure Complete Pathways

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Rationale for Significant Exposure to COPCs
Current and Future	Soil	Surface Soil (0-1 Foot)	Onsite surface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Industrial Worker	Adult	Dermal, Ingestion, Inhalation	Industrial workers may contact COPCs in surface soil during work activities. Site H/S Plan and PPE should minimize exposure. Exposure not significant.
				Trespasser	Adolescent	Dermal, Ingestion, Inhalation	Occasional trespassers may contact COPCs in surface soil in the Land Disposal Area and the exposure pathway is complete. Due to high concentration of PAHs the exposure is significant.
Current and Future	Bank soil	Bank soil (0-1 foot)	Bank soil along Five Mile Creek	Recreator	Adult/ Adolescent/ Child	Dermal, Ingestion	Recreators may contact COPCs in bank soil and the pathway is complete. Exposure could be significant.
Current and Future	Sediment	Sediment (0-1 foot)	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/ child	Dermal, Ingestion, Inhalation	A fence encloses most of the ditch. However, the outfall into Five Mile Creek is not fenced. Occasional trespassers may contact COPCs (PAHs) in ditch exceed screening levels. Exposure is significant in the area of the ditch at the confluence with Five Mile Creek and outside fence next to Summit Street. COPCs exceed cleanup levels.

Current and Future	Sediment	Sediment (0-6 inches)	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion	Recreators may contact COPCs in sediment not covered by surface water. The exposure pathway is complete. Exposure is not considered to be significant.
Current and Future	Surface water	Surface water	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Occasional trespassers may contact COPCs in ditch. Most of the ditch has been fenced off except for confluence with Five Mile Creek. Exposure not considered to be significant.
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Exposure is not significant for SWMU 22. SWMU 13 surface water. VOCs are above the MCL. A fence controls access to the SWMUs and exposure is not significant.
Current and Future	Surface water	Surface water	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion, Inhalation	Recreators may contact COPCs with surface water. Exposure is not significant.
Current and Future	Surface water	Surface water	Five Mile Creek	Recreator	Adult/Adolescent/Child	Dermal, Ingestion,	Recreators may contact COPCs with surface water during recreational activities.
Current and Future	Groundwater	Seeps	LaFarge quarry walls	Mining worker	Adult	Ingestion	Exposure pathway is likely incomplete to mining workers. Exposure to COPCs is not considered significant.
Current and Future	Food	Fish	LaFarge Quarry	Recreator	Adult/Adolescent/	Ingestion	Recreators may ingest COPCs with in fish caught in quarry lake if bioaccumulative chemicals are

							present. Fish tissue should be analyzed for metals. Exposure is not considered to be significant at this time.
Current and Future	Food	Fish	Five Mile Creek	Recreator	Adult/ Adolescent/ Child	Ingestion	Recreators may ingest COPCs in fish caught in Five Mile Creek if bioaccumulative chemicals are present. Fish tissue should be analyzed for COPCs. Exposure pathway may not be complete. Exposure is not known to be significant.
Current and Future	Surface water	Surface water	LaFarge Quarry Lake	Mining Worker/ Trespasser	Adult/ Adolescent/ Child	Dermal, Ingestion,	Mine workers and Trespassers may contact COPCs with surface water during recreational activities. Exposure is not considered to be significant.
Current and Future	Indoor air	Indoor air (onsite)	Indoor air (onsite)	Industrial worker/office worker	Adult	Inhalation	Industrial workers and office workers may inhale volatile COPCs in IVA1 in the Coke Plant. Exposure is considered significant until verified.
Current and Future	Ambient air	Ambient air (onsite)	Ambient air across the site where there are impacted soils.	Workers	Adult	Inhalation	Industrial workers and office workers may inhale volatile COPCs in vapor and dust from surface soil. Exposure pathway is complete for workers and trespassers. OSHA regulates occupational exposure to air.
				Trespassers	Adult/ Adolescent/ Child	Inhalation	

							A fence prevents access to site to trespassers and inhalation of ambient air.
Current and Future	Soil	Subsurface soil (1-10 Feet)	Onsite subsurface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Construction Workers	Adult	Dermal, Ingestion and Inhalation	Construction workers may contact COPCs in subsurface soil. Exposure pathway is not complete if PPE is used. OSHA Regulates occupational exposure.
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25 SWMU 22 SWMU 13	Construction Workers	Adult	Dermal/ Ingestion/ Inhalation	Construction workers may contact drainage ditch sediment during construction activities. Exposure pathway is not significant if PPE is used. OSHA regulates occupational exposure.
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25 SWMU 22 SWMU 13	Trespassers	Adolescent	Dermal/ Ingestion/ Inhalation	Exposure to COPCs is significant at SWMU 25. A fence prevents contact with COPC at SWMU 22 and SWMU 13.
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22 and drainage ditch next to BTF Area	Construction Workers	Adult	Dermal	Construction workers may contact drainage ditch water during construction activities. Exposure pathway is not complete if PPE is used. OSHA regulates occupational exposure.
Current and Future	Groundwater	Ambient Air (onsite)	Ambient air at Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Inhalation	Construction workers may inhale COPCs volatilized into the ambient air from shallow groundwater plumes. Exposure pathway is

							complete. OSHA regulates occupational exposure. Exposure potential is not significant.
Current and Future	Groundwater	Shallow groundwater (onsite)	Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Dermal	Construction workers may contact COPCs in ditches from shallow groundwater plumes. Exposure is not complete if PPE is used. Exposure is not considered significant.
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Dermal, Ingestion	Groundwater is not used as a potable source. Exposure pathway is not complete. Exposure is not significant.
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Inhalation	Groundwater is not used as a potable source. Exposure pathway is not complete. Exposure is not significant.
Current and Future	Soil	Soil	Residential properties and schools (offsite)	Residents, students, teachers	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may come into contact with COPC while gardening and play in the soil. COPCs exceed EPA cleanup level. Exposure is considered to be significant.
Current and Future	Food	Food	Residents (offsite)	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/	Residents may come into contact with COPC while eating vegetables grown in impacted soil if there is bio uptake of the COPCs of impacted soil in gardens. There is a complete pathway if vegetables are not properly

							washed. Exposure not considered to be significant.
Current and Future	Ambient air	Air	Residents	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may breath, eat, and be covered in contaminated dust blown into neighborhoods. The pathway is complete. Significance of exposure from coal is not known.
Current and Future	Ambient Air	Groundwater to Vapor Intrusion to Indoor Air	Residents	Residents	Children/ Adolescent/ Adults	Inhalation	If a residential home or school is located within 100 feet of a residence then there may be a complete pathway. There does not appear to be a complete pathway at this time. Exposure is not known to be significant.
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Ingestion	Well water is not in use onsite or offsite. Exposure pathway is not complete. Exposure is not significant.
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Inhalation/ Ingestion/ Dermal	Well water is not in use onsite or offsite. Exposure pathway is not complete. Exposure is not significant.
Current and Future	Sediment	Sediment	Sediment in ditch outside fence line of Walter Coke Property next to Shuttlesworth and 35 th Avenue.	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may come into contact with COPC while walking along fence line. COPC exceed soil residential soil screening levels. There is a complete pathway. Exposure is significant.

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5. Can the “significant” exposures (identified in #4) be shown to be within acceptable limits?
- _____ If yes (all “significant” exposures have been shown to be within acceptable limits) continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
- X If no (there are current exposures that can be reasonably expected to be “unacceptable”)-continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
- _____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code.

Rationale and Reference(s)

Table 18
Exposure Acceptability

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Exposure Acceptability
Current and Future	Soil	Surface Soil (0-1 Foot)	Onsite surface soil; Coke Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area	Industrial Worker	Adult	Dermal, Ingestion, Inhalation	Acceptable
				Trespasser	Adolescent	Dermal, Ingestion, Inhalation	Occasional trespassers may contact COPCs in surface soil in the Land Disposal Area. Unacceptable exposure.
Current and Future	Bank soil	Bank soil (0-1 foot)	Bank soil along Five Mile Creek	Recreator	Adult/ Adolescent/ Child	Dermal, Ingestion	Unacceptable
Current and Future	Sediment	Sediment (0-1 foot)	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/ child	Dermal, Ingestion, Inhalation	Outfall into Five Mile Creek is not fenced. Occasional trespassers may contact COPCs (PAHs) in ditch exceed screening levels. Exposure is significant in the area of the ditch at the confluence with Five Mile Creek and outside fence next to Summit Street. COPCs exceed cleanup levels. Unacceptable.
Current and Future	Sediment	Sediment	Harriman Park	Recreator	Adult/child	Dermal,	Acceptable

		(0-6 inches)	Ditch			Ingestion	
Current and Future	Surface water	Surface water	Drainage Ditch onsite (next to BTF Area)	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Acceptable
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22	Trespasser	Adolescent/child	Dermal, Ingestion, Inhalation	Acceptable
Current and Future	Surface water	Surface water	Harriman Park Ditch	Recreator	Adult/child	Dermal, Ingestion, Inhalation	Surface water samples not taken.
Current and Future	Surface water	Surface water	Five Mile Creek	Recreator	Adult/Adolescent/Child	Dermal, Ingestion,	Acceptable
Current and Future	Groundwater	Seeps	LaFarge quarry walls	Mining worker	Adult	Ingestion	Acceptable
Current and Future	Food	Fish	LaFarge Quarry	Recreator	Adult/Adolescent/	Ingestion	Acceptable at this time.
Current and Future	Food	Fish	Five Mile Creek	Recreator	Adult/Adolescent/Child	Ingestion	Unknown
Current and Future	Surface water	Surface water	LaFarge Quarry Lake	Mining Worker/Trespasser	Adult/Adolescent/Child	Dermal, Ingestion,	Acceptable
Current and Future	Indoor air	Indoor air (onsite)	Indoor air (onsite)	Industrial worker/office worker	Adult	Inhalation	OSHA regulates occupational exposure to air. Industrial workers and office workers may inhale volatile COPCs in IVAI in the Coke Plant. It is unknown if exposure is significant without air monitoring.
Current and Future	Ambient air	Ambient air (onsite)	Ambient air across the site where there are impacted soils.	Workers	Adult	Inhalation	Industrial workers and office workers may inhale volatile COPCs in vapor and dust from surface soil. Exposure pathway is complete for workers. OSHA regulates occupational exposure to air. A fence prevents access to trespassers and inhalation of ambient air.
				Trespassers	Adult/Adolescent/Child	Inhalation	
Current and Future	Soil	Subsurface soil (1-10 Feet)	Onsite subsurface soil; Coke	Construction Workers	Adult	Dermal, Ingestion and	Acceptable

			Manufacturing Plant; former Chemical Plant, Land Disposal Area, and BTF Area			Inhalation	
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25 SWMU 22 SWMU 13	Construction Workers	Adult	Dermal/ Ingestion/ Inhalation	Acceptable
Current and Future	Sediment	Sediment	Drainage Ditches on site including SWMU 25 SWMU 22 SWMU 13	Trespassers	Adolescent	Dermal/ Ingestion/ Inhalation	Unacceptable Exposure at SWMU 25. A fence prevents contact with COPC at SWMU 22 and SWMU 13.
Current and Future	Surface water	Surface water	SWMU 13, SWMU 22 and drainage ditch next to BTF Area	Construction Workers	Adult	Dermal	Acceptable
Current and Future	Groundwater	Ambient Air (onsite)	Ambient air at Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Inhalation	Acceptable
Current and Future	Groundwater	Shallow groundwater (onsite)	Former Chemical Plant, BTF, Coke Plant from associated groundwater plumes	Construction worker	Adult	Dermal	Acceptable
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Dermal, Ingestion	Acceptable
Current and Future	Groundwater	Onsite tap water	Onsite tap water	Industrial worker	Adult	Inhalation	Acceptable
Current and Future	Soil	Soil	Residential properties and schools (offsite)	Residents, students, teachers	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Unacceptable
Current and Future	Food	Food	Residents (offsite)	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/	Acceptable if food is washed.
Current and Future	Ambient air	Air	Residents	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Residents may breath, eat, and be covered in contaminated dust blown into neighborhoods. The pathway is complete. Health significance of exposure from

							coal dust s not known. Ambient in air general is within the acceptable risk range.
Current and Future	Ambient Air	Groundwater to Vapor Intrusion to Indoor Air	Residents	Residents	Children/ Adolescent/ Adults	Inhalation	currently acceptable
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Ingestion	Acceptable
Current and Future	Groundwater	Tap Water	Residents	Residents	Children/ Adolescent/ Adults	Inhalation/ Ingestion/ Dermal	Acceptable
Current and Future	Sediment	Sediment	Sediment in ditch outside fence line of Walter Coke Property next to Shuttlesworth and 35 th Avenue.	Residents	Children/ Adolescent/ Adults	Ingestion/ Dermal/ Inhalation	Unacceptable

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6. Check the appropriate RCRAInfo status codes for the Current Human Exposures Under Control EI event code (CA 725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

 YE -Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the facility, EPA ID , located at under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.


 X NO -"Current Human Exposures" are NOT "Under Control."

 IN -More information is needed to make a determination.

Completed by James H. Smith
Corrective Action Section

Signature/Date/  3/16/2012

Supervisor Karen Knight, CHMM, Chief
Corrective Action Section

Signature/Date/  3/16/2012

Locations where References may be found:

Region 4 – RCRA Administrative Record for Walter Coke Inc.
61 Forsyth Street
Atlanta, GA 30303

Contact telephone and e-mail numbers

James H. Smith, Corrective Action Section
Phone: (404) 562-8502
Email: smith.jamesh@epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

